

REMARKS

The Final Office Action of December 1, 2004, has been received and reviewed.

Claims 31-35 and 37-45 are currently pending and under consideration in the above-referenced application, each standing rejected.

Reconsideration of the above-referenced application is respectfully requested.

Rejections Under 35 U.S.C. § 112, First Paragraph

Each of claims 37-41, 44, and 45 has been rejected under 35 U.S.C. § 112, first paragraph, for reciting subject matter which was purportedly not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention.

Specifically, the Office has asserted that the as-filed specification does not provide support for “a HSG polysilicon layer on [a] storage poly structure and a dielectric material . . .” Final Office Action, pages 2 and 6.

One of ordinary skill in the art would readily understand from the specification of the above-referenced application that the inventors were, in fact, in possession of the claimed invention at least as early as the first date to which a claim for priority has been made in the above-referenced application. Specifically, the specification of the as-filed application and its parent provide adequate written support for a structure that includes HSG polysilicon on a storage poly structure and for a structure which includes recesses that are lined with a dielectric material.

Leaving “a HSG polysilicon layer on [a] storage poly structure” would be a passive act rather than an affirmative act. The specification of the above-referenced application does not require that the remainders of the HSG polysilicon be removed, nor is there any reason that they must be removed. In fact, one of ordinary skill in the art would readily understand that it does not matter if any HSG polysilicon remains on the storage poly structure. This is because HSG polysilicon may have substantially the same electrical conductivity properties as the portions of the polysilicon layer that underlie any remaining HSG. In fact, by lacking a boundary, the drawings reasonably convey to one of ordinary skill in the art that the remaining HSG polysilicon

may have substantially the same characteristics as polysilicon of the storage poly. Therefore, the specification of the above-referenced application reasonably conveys to one of ordinary skill in the art that portions of the HSG polysilicon may remain and that the resulting structure includes HSG polysilicon.

Further, to many of skill in the art, the extra process steps that would be required to remove the HSG polysilicon would be undesirable, as such processing would not only remove the HSG, but also the polysilicon beneath the HSG. The potential consequences of such processing would be damage to the capacitor electrode, as well as failure of the resulting device.

The Office appears to be looking for some requirement that the HSG polysilicon *must* remain over the storage poly structure (*i.e.*, is inherent, or present in every embodiment). There is no inherency requirement in 35 U.S.C. § 112, first paragraph, or its accompanying case law. Thus, there is no requirement that a claimed element *must* be present in the disclosed exemplary embodiments of the invention. Rather, 35 U.S.C. § 112, first paragraph, and its accompanying case law merely require that the description of the invention reasonably convey all of the claim elements to one of ordinary skill in the art.

It is, therefore, respectfully submitted that the as-filed specification of the above-referenced application provides one of ordinary skill in the art with an adequate written description of the subject matter recited in claims 37-41, 44, and 45. For these reasons, each of claims 37-41, 44, and 45 complies with the requirements of the first paragraph of 35 U.S.C. § 112. Accordingly, the 35 U.S.C. § 112, first paragraph, rejections of claims 37-41, 44, and 45 should be withdrawn.

Rejections Under 35 U.S.C. § 102

Claims 31-35 and 37-45 stand rejected under 35 U.S.C. § 102(b) for reciting subject matter which is purportedly anticipated by that described in U.S. Patent 5,256,587 to Jun et al. (hereinafter “Jun”).

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single reference which qualifies as prior art under 35 U.S.C. § 102. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053

(Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Jun describes patterned polysilicon structures that include upwardly protruding “fingers.” See FIGs. 4a-4d. Portions of hemispherical grain particles 14 may remain on upper ends of the fingers. See FIG. 4c. In addition, an insulation layer 15, which acts as a mask, may be located over the remaining portions of the hemispherical grain particles 14 that remain on the upper ends of the fingers. See FIG. 4d.

It has been asserted that FIG. 4c of Jun expressly describes a structure which includes “contiguous” HSG particles because “figure 4c shows storage poly fingers connected throughout in an unbroken sequence.” Final Office Action, page 3. Nonetheless, FIG. 4c clearly depicts each finger as including an isolated remaining portion of the HSG polysilicon on the top thereof. The Office has also noted, at pages 7-9 of the Final Office Action that there are only two reasonable “interpretations” of “contiguous mesas” and “contiguous webs”; *i.e.*, that “contiguous” refers either to the top surfaces of the bases of the storage poly. Jun clearly lacks any express or inherent description of the first “interpretation” of these phrases. The Office’s second “interpretation” of the phrases “contiguous mesas” and “contiguous webs” is not applicable to several of the claims of the above-referenced application.

Independent claim 31 is directed to a semiconductor storage capacitor poly that includes downwardly extending recesses and a plurality of contiguous mesas that comprise a plurality of *contiguous top surfaces* forming a maze-like structure.

Independent claim 31 is not subject to the Office’s second “interpretation” of contiguous mesas because independent claim 31 requires that the contiguous mesas include *contiguous top surfaces*, language that is not met by the contiguous base shown in FIG. 4c of Jun. In fact, Jun lacks any express or inherent description of a structure that includes a storage poly with *contiguous top surfaces* that form a maze-like structure. Instead, the disclosure of Jun is limited to a structure that includes spaced-apart fingers, the top surfaces of which do not form anything resembling a “maze-like structure.”

Therefore, the disclosure of Jun does not anticipate each and every element of independent claim 31, as would be required to maintain the 35 U.S.C. § 102(b) rejection of independent claim 31.

Claim 32 is allowable, among other reasons, as depending from claim 31, which is allowable.

Independent claim 33 also recites a semiconductor capacitor storage poly. The capacitor storage poly of independent claim 33 includes downwardly extending recesses, a plurality of contiguous webs that comprise *contiguous top surfaces*, and HSG polysilicon on at least some of the contiguous top surfaces.

Like independent claim 31, the plain language of independent claim 33 prevents application of the Office's second "interpretation" of the phrase "contiguous webs"—independent claim 33 clearly requires that the contiguous webs comprise contiguous top surfaces. In contrast, the top surfaces of the "fingers" described in June are spaced-apart from one another. Thus, Jun includes no express or inherent description of a storage poly that includes "a plurality of contiguous webs comprising a plurality of contiguous top surfaces."

Therefore, the subject matter described in Jun does not anticipate that recited in independent claim 33. Accordingly, under 35 U.S.C. § 102(b), independent claim 33 recites subject matter which is allowable over the subject matter described in Jun.

Claim 34 is allowable, among other reasons, as depending from claim 33, which is allowable.

Independent claim 35 recites an intermediate semiconductor capacitor structure that includes a storage poly structure comprising a plurality of contiguous mesas, a contiguous HSG polysilicon layer on and in contact with the storage poly structure, and a mask over the HSG polysilicon layer. Recesses in the storage poly structure are exposed through the contiguous HSG polysilicon layer and the mask. Mesas are broad, flat-topped elevations with cliff-like sides. Contiguous mesas are connected to one another. An example of contiguous mesas has

been shown on page 7 of the Final Office Action, and is identified by reference nos. 9a, 9b, and 9c.

Jun neither expressly nor inherently describes a storage poly structure with a plurality of contiguous mesas. Instead, Jun merely describes a storage poly structure with a plurality of spaced-apart “fingers,” or flat-topped elevations that are spaced apart from one another. As the “fingers” of the storage poly structure of Jun are spaced apart from one another, they cannot comprise a plurality of *contiguous* mesas, as is required by independent claim 35.

Therefore, Jun does not anticipate each and every element of independent claim 35, as would be required to maintain the 35 U.S.C. § 102(b) rejection of independent claim 35.

Independent claim 37 recites an intermediate semiconductor memory cell structure that includes a storage poly structure, a plurality of contiguous low elevation regions of an HSG polysilicon layer on and in contact with the storage poly structure, recesses formed in the storage poly structure laterally between the low elevation regions, and dielectric material at least lining the recesses.

The portions of the structures shown in Jun that would be analogous to the “low elevation regions of [the] HSG polysilicon layer” recited in independent claim 37 are portions of the hemispherical grain particles 14 shown in FIGs. 4c and 4d of Jun that remain following the formation of the spaced-apart poly fingers. Jun lacks any express or inherent description that any of the low elevation regions may be contiguous with one another, as required by independent claim 37.

It is, therefore, respectfully submitted that Jun does not anticipate each and every element of independent claim 37. As such, it is respectfully submitted that, under 35 U.S.C. § 102(b), independent claim 37 recites subject matter which is allowable over that described in Jun.

Independent claim 38 recites a semiconductor memory cell structure that includes “regions of hemispherical-grain polysilicon on at least portions of an upper surface of the storage poly structure . . . and a dielectric layer substantially coating an upper surface of the storage poly

structure and substantially lining each of [a] plurality of recesses.” The plurality of recesses impart the storage poly structure with a structure that resembles a plurality of contiguous mesas.

Jun neither expressly nor inherently describes that the recesses between the polysilicon “fingers” thereof impart the storage poly structure with a structure that resembles “a plurality of contiguous mesas,” as is required by independent claim 38. Rather, Jun only describes recesses that impart the storage poly structure thereof with a structure that resembles spaced-apart fingers.

Therefore, Jun does not anticipate each and every element of independent claim 38, as would be required to maintain the 35 U.S.C. § 102(b) rejection thereof. Accordingly, it is respectfully submitted that, under 35 U.S.C. § 102(b), independent claim 38 is directed to subject matter which is allowable over the disclosure of Jun.

Each of claims 39-41 is allowable, among other reasons, for depending either directly or indirectly from claim 38.

Claim 40 is further allowable since Jun lacks any express or inherent description of a semiconductor memory cell structure that includes HSG having a web-like appearance. Instead, the description of Jun is limited to low elevation regions of a hemispherical grain polysilicon layer that are isolated from one another by the spacing between fingers of the storage poly structure.

Independent claim 42 recites an intermediate semiconductor capacitor structure that includes a storage poly structure, a substantially confluent HSG polysilicon layer on the storage poly structure, and a mask positioned over the HSG polysilicon layer. Planarized portions of the HSG polysilicon layer are exposed through the mask.

The description of Jun is limited to processes in which upper elevation portions of the hemispherical grain particles 14 disclosed therein protrude from the dielectric layer 16. Jun does not expressly or inherently describe a structure which includes planarized portions of a hemispherical-grain polysilicon layer that are exposed through a mask, as recited in independent claim 42.

Therefore, Jun does not anticipate each and every element of independent claim 42. It is, therefore, respectfully submitted that, under 35 U.S.C. § 102(b), independent claim 42 is drawn to subject matter which is allowable over the subject matter described in Jun.

Independent claim 43 also recites an intermediate semiconductor capacitor structure. The intermediate semiconductor capacitor structure of independent claim 43 includes a storage poly structure with recesses therein, remaining portions of an HSG polysilicon layer substantially overlying upper portions of the storage poly structure, and a mask positioned over the HSG polysilicon layer. The HSG polysilicon layer has a web-like appearance. The mask is located laterally between the recesses in the storage poly structure, with the recesses being exposed therethrough, and is substantially spaced apart from the storage poly structure by way of the remaining portions of HSG polysilicon layer.

Independent claim 44 recites an intermediate semiconductor capacitor structure that includes a storage poly structure with recesses therein, an HSG polysilicon layer having a web-like appearance on at least portions of the storage poly structure, and dielectric material lining at least the recesses.

Independent claim 45 is directed to an intermediate semiconductor memory cell structure that includes a storage poly with recesses therein, low elevation regions of an HSG polysilicon layer substantially covering an upper surface of the storage poly structure, and dielectric material at least lining the recesses. The HSG polysilicon layer of independent claim 45 has a web-like appearance.

As the Office's second "interpretation" of the phrases "contiguous mesas" and "contiguous webs" are limited to the entire storage poly structures of June rather than to the remaining portions of the HSG polysilicon layers of such structures, that "interpretation" cannot be applied to any of independent claims 43-45.

As noted previously herein, the description of Jun is limited to remainders of low elevation regions of a hemispherical grain polysilicon layer that are isolated from one another. Jun does not expressly or inherently describe that any of the *remaining portions of the*

hemispherical grain polysilicon layer disclosed therein have a collective web-like appearance, as recited in each of independent claims 43, 44, and 45.

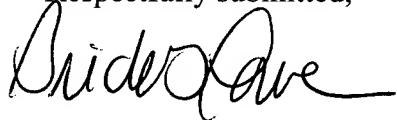
Therefore, Jun does not anticipate each and every element of any of independent claims 43, 44, or 45, as would be required to maintain the 35 U.S.C. § 102(b) rejections of these claims.

In view of the foregoing, it is respectfully requested that the 35 U.S.C. § 102(b) rejections of claims 31-35 and 37-45 be withdrawn.

CONCLUSION

It is respectfully submitted that each of claims 31-35 and 37-45 is allowable. An early notice of the allowability of each of these claims is respectfully solicited, as is an indication that the above-referenced application has been passed for issuance. If any issues preventing allowance of the above-referenced application remain which might be resolved by way of a telephone conference, the Office is kindly invited to contact the undersigned attorney.

Respectfully submitted,



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